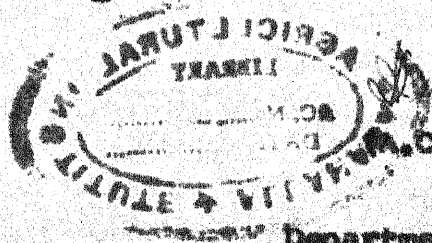# ALLAHABAD AGRICULTURAL INSTITUTE

Department of Agricultural Economics & Rural Sociology
CERTIFICATE OF ORIGINAL WORK

This is to certify that Shri P. Prasada Rao
of the University of Allahabad, planned his study,
carried out the experimental work involved, analysed
the data and prepared this thesis on "A Comparative
Study into the Economics of Local and High Yielding
Varieties of Cotton in Tyalluru Block, Guntur
(Andhra Pradesh)".

This he did in part fulfilment of the
requirements for the Master of Science in Agricul-
tural Economics Degree of the University of Allahabad.

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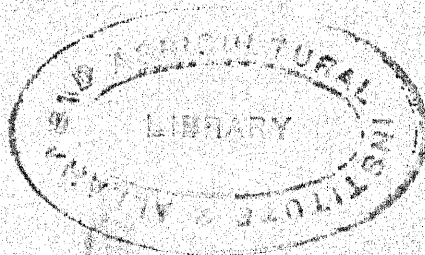
CERTIFICATE OF CHAIRMAN

AND

MEMBER OF THE EXAMINATION COMMITTEE

The thesis attached hereto, entitled "A Comparative Study into the Economics of Local and High Yielding Varieties of Cotton in Tyalluru Block, Guntur (Andhra Pradesh)" prepared and submitted by Shri P. Prasad Rao in partial fulfilment of the requirements for the degree of MASTER OF SCIENCE IN AGRICULTURAL ECONOMICS is hereby accepted.
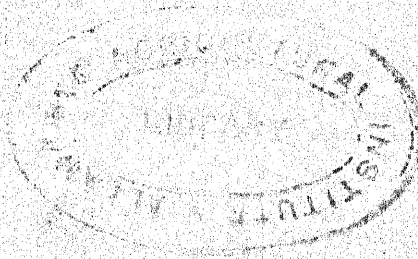
Member
Examination Committee

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Examination Committee

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Designation and Address

Date:

Date:

ACKNOWLEDGEMENT

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CHAPTER I

INTRODUCTION

If growth means provision of more goods and services per capita to the members of a society, production becomes a pre-condition of society's progress.

In a low income predominantly agricultural country, as ours is, the rate of growth of the economy is the function of rate of growth of agricultural sector. But ever since independence, India has been facing the problem of food shortage.

Removal of poverty and attainment of economic self-reliance are the two goals that the country has set for itself. The policy implications these two goals are to become self sufficient in food supply, economise in the use of imports and to expand exports. The main elements of the self-reliance objectives formulated by the Government in the Fifth Five year plan were (i) elimination of special forms of external assistance and (ii) phasing for the realisation of the goal of self-reliance.

A wide varieties of crops and the influence of food over non-food crops are the two distinct

Characteristics of Indian agriculture. Their share in exports, industrial requirements, national output, consumption etc. are few variables determining the importance of the crops. About forty crops are cultivated in India. The most important crops cultivated in India are rice, wheat, Jowar, maize, gram, ground-nut, cotton and sugarcane. The crops account for 44 percent of the total consumer expenditure, form 58 percent of the agricultural output and share 67 percent of the cultivated area and 75 percent of the irrigated area. One factor that has affected the commercial crops and inhibited their growth has been the process of attaining self-sufficiency adopted by the Government in the past (for example, in zonal system of fodd grains trade, each state was considered a separate zone, which implied that each state should be sufficient in foodgrains production. The zonal self-sufficiency in food grains imposed constraints on cultivation of commercial crops.

Cotton is one of the most important commercial crops and occupies an important place in the agricultural and industrial economy of the country. Cotton occupies a dominant position among the cultivated crops, which meets the material needs of the mankind. India was principal source of cotton for Great Britain and Europe in the past. India, which was a net exporter of cotton before partition became net importer of cotton after partition. From 1965 India imported an average of 2,44,000 bales of U.S. cotton annually upto June 1971 and spent about Rs 1,000 crores during
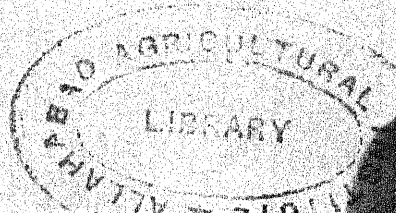
the same period[1]   Within this picture, it may be noted that amongst 60 countries where cotton is grown, India with about 8 million hectares ranks first in the world in respect of acrage under cotton and fourth in total production.   The average yield of cotton in India is only 145 Kg/ha, which is very low when compared to 1098, 853, 491 and 300 Kg/ha in Israel, USSR, USA and China respectively[2]

The crop, both in its raw and manufactures forms, yield a considerable revenue apart from earning foreign exchange to the worth of about Rs 77 crores a year.   The cotton textiles industry is the biggest industry in India, being the main stay for a very large number of farm growers, traders, hand looms, weavers and a number of others who are engaged in the textile industry and trade.   Cotton seeds provide a highly nutritious concentrated feed to the cattle with the development of technology cotton seeds are being used for extraction of oil for industrial use and edible purpose.   Cotton leaves can be used as an economic source for the production of citric acid saving for the country lakhs of rupees.   The utilisation of the by products of cotton would also strengthen the economy of cotton growers.

1.   Mirchandani, G.G. 1971.   Aspects of Agriculture in India (UNI Record).   Bombay : Allied Publishers. 184.

2.   Singh, M., Singh, K. and Brar, M. 1974.   How Cotton Yield can Be Raised.   Progressive Farming.   March. 10.

Cotton improvement work started from 1967 with the initiation of co-ordinated all India programme. Many improved varieties like Sujata, Krishna, Bharti, Mahalaxmi etc. are now available in different cotton growing tracts. The advent of MCU - 5 and H_4 extra long staple cotton is considered to be a significant mile-stone in cotton research.

The Government launched a three year programme with a view to becoming self-sufficient in cotton by adopting promotional measures suited to both irrigated and rainfed areas. Implementation of this programme started in 1971-72.

The recent international developments in the cotton textiles are (1) the textiles being labour intensive are ceasing to be economical for labour scarce, high wage advanced economics. (2) There are signs of shift in consumers preference in several countries in cotton textiles and (3) the sharp rise in the price of petroleum is likely to work to the advantage of cotton textiles in relation to the synthetic fibre fabrics.

Our cotton production is much short of our requirement. The country has, during 1975-76 entered an agreement of purchasing two lakhs bales of cotton worth Rs 25 crores from Pakistan. It is estimated that raising average cotton yield from 122 to 150 Kilograms/acre would meet our requirements. For reasons already discussed, extra acreage under cotton can only be put at the cost of food grains crops and
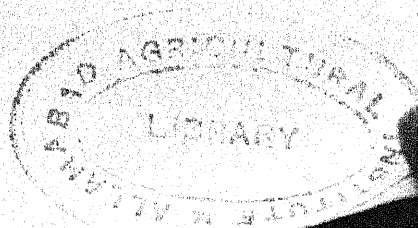
in view of low productivity it does not seem likely that there would be significant influence on cotton production. On the other hand most of the crops are rainfed and cultivation of low yield potential varieties belonging to desi cotton is high. It is worth noting here that nearly 60 percent of the total cotton area is under desi varieties, which have an average yield of 70 Kg/hec. Consequently 60 percent of the total cotton producing area accounts for only 30 percent of cotton production. The area under irrigated American cotton accounts for nearly 21 percent of the area and about 49 percent of the total production of cotton. The remaining area if under rainfed cotton and yields an average of about 135 Kgs/ha as against about 320 Kg/ha in irrigated American cotton area.

The general problem with respects to the crops thus appears to be the low yield both in traditional as well as for high yielding strains of cotton. It needs to be investigated whether more area under irrigated cotton can be brought. In this connection it may be pointed out that according to the Draft Fifth Five year plan two million more hectares are proposed to be brought under irrigated cotton.

Andhra Pradesh is an important cotton growing state, but the growth rate of productivity is high as compared to other cotton growing states. Within Andhra Pradesh cotton is mostly concentrated in Chilakaluripet region of Guntur district. Important characteristics of Guntur district is suitability of soils for cotton cultivation and irrigation facilities are also there.

Justification: High Yielding Varieties of cotton under irrigated conditions would be helpful in planning for cotton production. A study of the comparative profitability of these cotton varieties in an area where cotton is a main cash crop will enable an appraisal of development and suggest guidelines to improve the profitable production of cotton. It is hoped that this study will also be useful to the planners and technicians in the related field.

Objectives:

1. To find out the cost of production per hectare and per quintal and determine different measures of profits for local and high yielding varieties under different size groups.

2. To examine the utilisation of family and hired labour on different sizes of holdings.

3. To examine the input-output ratio.

4. To find out the most suitable high yielding varieties cotton for the selected area.

5. To evaluate how efficiently the prevalent factors are being used for the production of cotton, under given conditions.

Hypothesis:

1. The utilisation of family labour decreases with increase in size of holding and hired labour increases with increase in size of holding.
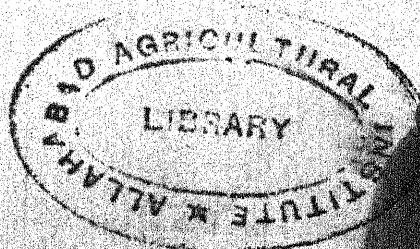
2. Cost of cultivation, output, net income, family labour income and farm business income per hectare decreases with the increase in size of holding.

3. Input-output ratio of different varieties differs significantly and decreases with increase in size of holding.

4. Cost of production per quintal of cotton significantly differs and increases with increase in size of holdings.

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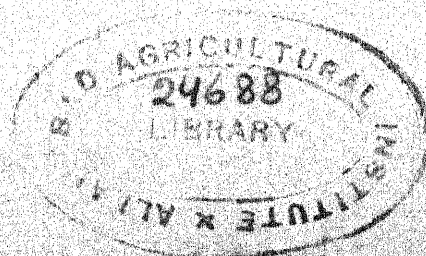
CHAPTER II

REVIEW OF LITERATURE

Several attempts have been made to work out the input-output analysis of cotton. A brief review of the important observations made by eminent authors, is given below.

With a self-sufficiency in foodgrain production in sight, there is need for increasing attention to the problem of production and marketing of the commercial crops. It is in this context that depth studies of individual commodities could be fruitful.[1]

Recently at the cotton seminar held in Hyderabad the Union Minister for Agriculture, Mr. A.P. Shinde made this point when he said, "If it is a question of lack of inputs, we have to identify the reasons for the same and take steps to ensure that the optimum doses are applied in every hectare.[2]

Cotton is grown in more than 70 countries, the majority of which are developing, the number of people earning their living from production and treatment of cotton is more than 100 million. It is the largest source of foreign exchange for the third world war.[3]

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1. G. Parthasarathy, Indian Journal of Agricultural Economics. Vol. XXVII, No. 2, April-June, 1972, pp.102

2. Shukla Mamra - 'Intensive Agriculture', Vol. No.7, September 1972, pp. 119

3. Raingward, J.E. 'Expansion of the world cotton market' World Agricultural Economics and Rural Sociology Abstracts Vol. No. 16, All, Nov. 1974 pp 16-17
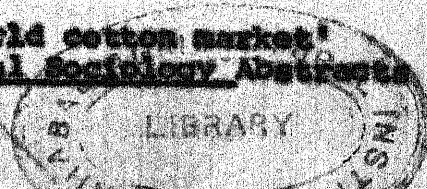
Reddy and Venkateswarlu (1972-73) conducted a survey of 25 farmers in order to examine the costs and returns from cotton-MCU-5 cultivation. The total cost of cultivation of one hectare of MCU-5 cotton was found to be Rs 2067. Of this the labour cost was Rs 620 i.e., about 30 percent and material cost was Rs 1447 i.e., about 70 percent. Total cost of Rs 2067 does not include items like rental value of owned land, interest on capital, and depreciation on implements and machinery. The average yield per hectare obtained was 20 quintals and the gross income per hectare was Rs 6280. The cost benefit ration obtained was 1 : 2.04.[4]

C. Rajagopal Reddy (1973-74) conducted a survey of 20 farmers in five villages in Guntur district to compare the economics of cultivation of Varalaxmi cotton with that of MCU-5.

The total cost of cultivation of an acre of Varalaxmi cotton and MCU-5 found out to be Rs 2,716 and Rs 1,715 respectively. Of this the labour cost accounts for Rs 886 and Rs 635 and material cost Rs 1,830 and Rs 1080 respectively for Varalaxmi and MCU-5. In both cases, pesticides occupy major portion followed by cost of seed in case of Varalaxmi and cost of manures and fertilizers in case of MCU-5.

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4. Reddy, A.S. and Venkateswarlu, U., "The Economics of Cotton (MCU-5) Cultivation in Guntur District, Andhra Pradesh," Agriculture and Agro-industries Journal, Vol. VI, No. 11 Nov. 1973, pp. 1-4.
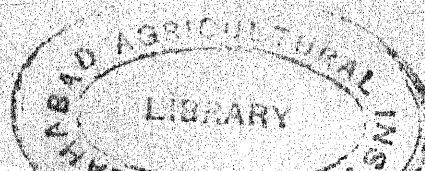
The average yield obtained from one acre is 10 quintals of kapas for Varalaxmi and 8 quintals of kapas MCU - 5. The net income derived from one acre is Rs 5,809 for Varalaxmi and Rs 2,110 for MCU-5 indicating more net income for Varalaxmi. The benefit cost ratio is 1.00 : 2.14 and 1.00 : 1.23 respectively for Varalaxmi and MCU-5 meaning Varalaxmi cotton growers receive higher profits.[5]

As a result of intensive research throughout the country few high yielding and better quality cotton like Hybrid - 4, MCU - 5, Sujata, Varalaxmi etc. have been evolved. Their yield and quality characters have been recognised by the mills and the cultivators alike. Hybrid - 4 has already made an impact. It will take some time for other quality strains to spread to larger areas so that they could contribute substantially to the overall production in the country.

Greater emphais on the availability of remunerative prices to cotton growers could be laid so that the present level of cotton area is held intact and thus checked from diversion to other food and competing crops.[6]

5. C. Rajagopal Reddy "Economics of Varalaxmi Cotton Cultivation in Guntur district, Andhra Pradesh", Financing Agriculture. Vol. VI, No. 4, January 1975, pp. 16-17

6. P.B. Rao, M.V. Pavate, B.V. Verma, "Shift of area, towards better staple Cotton", Agriculture and Agro-industries Journal Vol. 7, No. 7, July 1974, pp. 13-16.

Shukla B.D. and Singh (1905-66) collected input-
output data from 32 cotton producers in the Mathura district.
The cost of production of cotton per acre varied betwen
Rs 148 on large farms and Rs 185 on small farms. The value
of output per acre varied between Rs 276 and Rs 309 respectively.
Analysis of distribution of costs on input factors per acre
showed that human labour constituted about 59 percent of
the total cost on all farms and bullock labour accounted
for about 13 percent. The proportion of family labour
employed on farms gradually decreased while that of hired
labour tended to increase as the size of holding increased.
Net income increased with the increase in the size of farm.

The input output ratio increased from 1 : 1.67
on small farms, 1 : 1.87 on large farms, probably due to
economics of scale. It is suggested that there is wide
scope for increasing the output by increasing the level of
inputs with a view to increasing the level of employment
and standard of living of farmers in the district.[7]

Dixit R.S. and Mishra (1968) conducted a survey
on economics aspects of cotton cultivation in Intensive
Agricultural District programme Block Hathras of Aligarh
district. The analysis shows the area under cotton per
farm and percentage area under cotton to total cropped area
increased with the size group, cereals were grown in small

7. Shukla, B.D. and Singh R.S., "Economics of Cotton
   Cultivation in Mathura District". World Agricultural
   Economics and Rural Sociology abstracts Vol. XI,
   No. 4, Dec. 1969 pp.900.

size groups. Similarly, large size groups used larger
quantities of fertilizers, adopted improved technology
over a larger area and costs of production per quintal and
per hactare were lower.

On the whole, the study showed that large farmers
benefited most by the Intensive Agricultural District
programme.[8]

All India coordinated cotton improvement project
conducted trails in Haryana, Punjab, Rajasthan, Karnataka
and Tamil Nadu.

The project was revealed an additional yield of
580 Kg. per hectare can be obtained from irrigated cotton
by adopting improved techniques with optimum fertilizer
dose and pesticide coverage.

The increase of 120 Kg per hectare in Haryana,
130 Kg in Punjab, 50 Kg in Rajasthan, 94 Kg. in Karnataka
and 272 Kg. per hectare in Tamil Nadu was brought about by
the adoption of the improved production techniques.[9]

A.C. Gangwar and Singh I.J. collected in input-
output data of the deshi and American cotton from 41
farmers in Hissar district.

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8. Dixit R.S., Mishra, S.D. "An Economic Analysis of Cotton
   Cultivation". Agricultural Situation in India. Vol. XXIII,
   No. 10, Jan. 1969, pp. 1031-6.

9. Choken Singh, "More from Irrigated Cotton" Intensive
   Agriculture, Vol. XII, No. 10, Dec. 1974, pp. 14

The cost of cultivation of Deshi and American cotton based on the existing cultivation practices followed by the farmer was Rs 1,665.74 and Rs 2,394.2 per hectare. The net income per hectare for the Deshi and American cotton was Rs 927.59 and Rs 1,358.01 respectively. Input-output ratio of both the types of cotton was 1 : 1.50 The yield variability of both the varieties of cotton was more or less the same but the price variability found to be higher in the case of American cotton. The cultivation of both the varieties of cotton remains profitable even after discounting the yield and price variability.[10]

The study was confined to villages of Sinor Taluqa of Baroda district, which has been covered under the intensive cotton development programme.

The average cost of cultivation of Digvijay cotton worked out to Rs 1,914.44 per hectare and that for MCU - 5 cotton worked out to Rs 2,088.71. On an average the Digvijay cotton gave a net return of Rs 2,194.37 per hectare and MCU-5 cotton gave a net return of Rs 2,731.96 per hectare. The average input-output ratio at cost C calculated to be 2.14 and 2.32 for Digvijay and MCU - 5 cotton respectively.[11]

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10. Gangwar, A.C. and Singh I.J. "Economic feasibility of financing cotton growers in Hissar District Haryana, "Finance Agriculture" Vol. VII, No.1, April-June 1975, pp.14-16

11. Madalia, V.K., Bakadia, M.U. "A study on Economics of Cotton Cultivation in Baroda District," Finance Agriculture, Vol. VII, No. III, Oct-Dec, 1975, pp. 15-18.
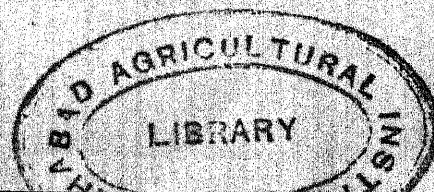
The input - output relationship in the production of the two selected varieties of cotton i.e. Digvijay (short staple,)and Devitej (long staple) was investigated by a survey in a typical cotton growing tract of North Gujarat. The economic possibilities of increasing the net income of the cotton growers by changes in the input mixture were also explored. Regression analysis is used to generate production, coefficients and an estimating equation shows that there are constant returns to scale in cotton production with land, seed, manure and irrigation, labour and investment in implements as the independent variables.[12]

Garg and Singh (1969-70) conducted a study on the economics of production and marketing of cotton in Debai block of Bulandshahr district. The study was related to two varieties of cotton, viz.- Pramukh (An American Variety) and Shamli (Deshi variety), on four size groups of land holding.

The analysis reveals that, on an average the Pramukh variety gave an additional net income of Rs 334.27 per hectare over Shamli. Net income for the Pramukh and the Shamli was Rs 693.77 and Rs 359.50 per hectare respectively. The output and input per hectare showed an increasing trend with the increase in size of farms upto third size group of 4 to 6 hectares. The input-output

12. Maharaja, M.H. "Economics of Cotton Cultivation, "A Study in a selected region of Saburkantha District in Gujrat" World Agricultural Economics and Rural Sociology, Abstracts, Vol, VIII, No, 4, Dec, 1966 P. 706.
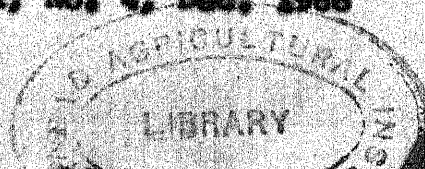
ratio in the Pramukh was higher than in the Shamli and came to 1 : 2.32 and 1 : 1.80 respectively. The yield per hectare also showed an increasing trend with the increase in size of farms in both the varieties. But per hectare costs in both the varieties showed increasing trend upto the size group of 4 to 6 hectares, whereas cost per quintal in same group was found much below in Pramukh variety. The average cost of production per quintal for variety Pramukh was Rs 66.73 and Rs 74.88 for variety Shamli, which has got less market value.[13]

The inadequate plant population in cotton is the result of wide plant to plant distance in sowing, poor quality seed, high seedling mortality and heavy infestation of weeds during the early part of the growth. The simplest method to overcome these drawbacks, to certain extent, would be to increase the seed rate by adjusting close distance between plant to plant so that desired plant density is obtained in the field and timely weeding in early growth stage.[14]

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13. Garg, J.S. and Singh, G.N., "Economics of Production and Marketing of Cotton in Bulandshahr district - A case study", Agricultural Marketing , Vol. XIII, No.3, Oct. 1970, pp. 1-5.

14. Mudholkar , Ahalawat, I.P.S.J. A Population Explosion in Cotton for higher Production". Farmer and Parliament Vol. VIII, No. 8, Aug. 1973 pp. 15-16.

Government launched a three year programme with
object to end the present stagnation in cotton production
by adopting promotional measures suited to both irrigated
and rainfed areas for making the country self-sufficient
in this commodity. Implementation of this programme
started in 1971-72.

Irrigated Areas: The irrigated area for cotton is spread
over some 55 districts of the country. Under the programme,
six districts have been selected in the irrigated zone:
Ferozpur and Bhatindo in Punjab, Hissar in Haryana, Sriganga-
nagar in Rajasthan, Baroda in Gujrat and Coimbatore in Tamil
Nadu. It was proposed to cover a total of four lakh hectares
of cotton cultivated area in these districts in 1971-72,
additional 80,000 hectares in 1972-73 and yet another
80,000 hectares in 1973-74.

Non-irrigated Areas: In non-irrigated areas it was proposed
to initiate a programme on pilot basis in approximately
1.40 lakh hectares spread over seven districts in different
States. These are Kurnool in Andhra Pradesh, Surendranagar
in Gujrat, Khargone in Madhya Pradesh, Akola and Yeotmal
in Maharashtra, Dharwar in Mysore and Tirunelveli in Tamil Nadu.

In each selected district an area of 2000 hectares
covered under the 'intensive programme' and another 18,000
hectares under the 'expanded programme'.[15]

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15. . . . . "Stepping Up Cotton Production - Three-
    Year Programme Launched", Farmer and Parliament, Vol. VI(9),
    September 1971, pp. 19-21.

Differentials in the growth of productivity of food grains and commercial crops among different districts of the Punjab State are studied by filling a linear function to productivity data. The results showed that in almost all the major crops, the growth rates of yield are found statistically significant except in the case of rice and gram. [16]

The causes for the unsteady production of cotton are lack of relative price stability to give greater assurance of steady income and so crops shifts by the farmers, lack of irrigation supply in the hard black soil areas where cotton is grown mostly, susceptibility of the crops to pestilence, unfavourable sowing and harvesting, climatic and weather conditions in several parts of the country, lack of effective impact of package measures.

To produce more of finer varieties of cotton-new dimensions of efforts on production practices and inputs, irrigation and water management supplies of improved seeds for planning fertilizer use, weed and pest control, harvesting techniques are essential. For improvement in the marketing system in the interests of cotton growers and users, new dimensions of effort on price policies,

16. R. Raul, J.C., Sondhi, R.K. "Differential growth of productivity in the Punjab" World Agricultural Economics and Rural Sociology abstracts. Vol. 16, No. 1, Jan. 1974, pp. 38

grading, storing, marketing, finance, ginning and
baling etc. are essential for increase cotton production.[17]

Rute reported the results of a Pilot 4-P
Project which was undertaken on cotton Hybrid-4, in about
182 acres in Baroda, Kaira and Broach districts on farmers
field during the year 1971-72. The results of this project
had also been excellent and the average yield of seed
cotton was about 10 to 12 quintals per acre which was 2 to
3 times more than average yield of seed cotton and gave
nearly Rs 1000 per acre as net profit to participating
farmers. The cost of cultivation has also been calculated
taking into consideration all inputs including the labour
put in by farmer himself. It came to about Rs 1750/- per
acre, which does not include the rental value of owned
land and interest on capital.[18]

Pattanashetti, C.C., and Gopal Rao, H.S. (1966)
conducted a case study of Hubli regulated market. Discussing
grading of agricultural commodities, they gave a comparative
picture of the benefits received by the sellers of cotton

17. Muthuswami Gopalan, 'Importance of white gold in
    the nation's economy." Khadi Gramodyog, Vol. XV,
    No. 9, pages 441-444.

18. Rute, S.B., "Crop Insurance Under GSFC 4-P Plan"
    Agriculture and Agro-industries Journal, Vol. VI,
    No. 11, Nov. 1973, pp. 5 - 8.

for the months of March, April and May 1964. Value per
unit of graded and ungraded cotton was calculated separa-
tely and the difference between the unit prices of graded
and ungraded cotton was derived. On an average, the grading
of cotton resulted in a net gain of & 13.79 per quintal during
1963.64.[19]

A survey (1965) was undertaken by I.C.A.R. in
collaboration with Indian Central Cotton Committee and
Indian Central Oilseeds Committee to study the cost of
cultivation of cotton and rotational crops. The survey
was conducted in important cotton growing districts of
Maharashtra, namely - Buldava, Akola, Amravati, Yeotmal,
Jalgaon and Aurangabad. It was observed that relatively low
average dose of manures and expenditure on manuring to be
very low. The percentage of fields manured was only about
40 percent. Another noteworthy feature of cotton cultivation
in this region is appreciable amount of female labour employed
in this crop, particularly for the operation of weeding and
picking cotton. The operational cost of & 15.24 per maund
was incurred. It was observed that the total operational
cost per acre was 56.69.[20]

19. Pattanshatti, C.C. and Gopal Rao, K.S., "Regulated markets
and Agricultural Prices", The Journal of Karnataka Univer-
sity - Social Sciences. Vol. II, May 1966, p. 12.

20. "Cost of Cultivation in Maharashtra State", Statistical
News Letter, I.A.R.I., New Delhi, Vol. XII, No. 1,
April 1965, pp. 12-15.

CHAPTER III

MATERIALS AND METHODS

Nature and Scope of the Enquiry

The enquiry was conducted to study the economics of cotton cultivation in the selected block cotton is the main cash crop and is grown by about 90 percent of the cultivators in the region. The present study is confined to high yielding varieties and traditional varieties under irrigated and non-irrigated conditions in the area covered by the Tyalluru block in the Guntur District of Andhra Pradesh. The high yielding varieties not only give high yield but also give better in ginning percentage. The study would enable a comparison of the profitability of these varieties in the area of study under the management practices followed by different cultivators. This study, being one of the farm management investigations, can give not only general information regarding the selected block but also serve as basis for sound agricultural policies and other development programmes in relation to agriculture

Selection of sample

The Block

The Tyalluru block was a purposively selected because of convenience in the collection of data as well as being a typical cotton growing region.

The total geographical area of the Guntur district is 500 square miles. The soils are black cotton soils.

The main staple food of the people is paddy and jowar. The main cash crops grown in the region   lies and tobacco.

The summer season starts from March to May is followed by the south-west monsoon season from June to September. The minimum and maximum temperature ranges between $90^{\circ}F$ and $118^{\circ}F$. This climate is most suitable for cotton cultivation.

The district is comprised of eight taluqs viz., Sattenapalli, Guntur, Tenali, Repalle, Bapatla , Narasaraopet, Vinukonda, Palnad. The present area of operation covering the Tyalluru block is one of the block in Sattenapalli Taluq.

The following table gives the details of the land utilization in the block.

Table 3.1 Land Utilization in Tyalluru Block.

Sl.	Particulars	Area in hectares	Percentage to total
1.	Area under forest	836	1.42
2.	Area not available for cultivation	15058	25.62
3.	Other uncultivated land excluding current fallow	5216	8.81
4.	Current fallow	4775	8.12
5.	Net area sown	32889	55.96
6.	Total Geographical area	58774	100.00

Source: The block Head quarter Tyalluru 73-74.

Cropping pattern of the block, area under different crops is given in table 3.2.

Table 3.2 Area and out-turn from principal crops in Tyalluru Block.[2]

S.No.	Crops	Area in Hextares	Out-turn in quintals
1.	Cotton	5943	106974
2.	Chillies	2110	24120
3.	Paddy	9059	226475
4.	Ground-nut	4186	41860
5.	Jowar	1607	9075
6.	Red gram	471	1413
7.	Pulses	2716	8148
8.	Tobacco	1957	13699
9.	Gram	49	252
10.	Turmeric	233	4660
11.	Castor	211	844
12.	Coriander	1100	4400
13.	Vegetables	54	540
14.	Fruits crops	4	NA
15.	Miscellaneous	3449	NA

(N.A. : Not available)

[2] Ibid.

Selection of Villages

A list of all villages 54 in the block was obtained from the block development office and was arranged in ascending order of net area sown. Five villages were then selected by the method of systematic sampling.

The details of area and population of the selected villages are given in the following table.

Table 3.3. Population and area of the selected villages

Sl. No.	Name of the village	Population	Total geographical area (hac)	Net area sown
1.	Mandepudi	2093	2346	2213
2.	Nemalikalli	1192	1328	1206
3.	Kambhampadu	4818	3557	3274
4.	Patibandala	4236	3129	2967
5.	Parasa	1028	630	592

Selection of Cultivators

A list of farmers growing HYVs cotton was obtained from the lekhpals of the selected villages. In each sample village 10 percent of the total farm holdings were selected by a method of selection where probability of selection was being propotional to size of holding. Thus, a sample of 52 farm holdings was obtained from a total of 261 holdings in the selected villages.

The following table gives the distribution of sample cultivators in selected villages.

Table 3.4 Distribution of Sample Cultivators in
Selected Villages

Sl.No.	Name of the villages selected in sample	Number of cotton growing farmers	
		Total	Selected
1.	Mandepudi	65	13
2.	Ramalikalli	51	10
3.	Kambhampadu	54	11
4.	Patibandala	61	12
5.	Parasa	30	6
	Total	261	52

For studying the profitability of each variety on different sizes of holdings the selected cultivators were again stratified into three groups on the basis of their size of holding.

Group I : Cultivators having 1 to 2.99 hectares of land.

Group II: Cultivators having 3 to 5.99 hectares of land.

Group III: Cultivators having land of 6 hectares and above.

The distribution of cultivators in respective size of groups is given in the following table.

Table 3.5 Distribution of cultivators according
to groups and varieties

Group	H.Y.Vs	Local Varieties
I	15	8
II	11	7
III	7	4
Total	33	19

Method of Enquiry

Survey method was used for the collection of
data. The cultivators were interviewed twice.

Schedules and Questionnaires

Family schedule was used for the collection of
data, a proforma of which is given in appendix.

Period of Enquiry :

This related to agricultural year 1974-75. The
field investigation was undertaken in the months of June and
July 1975

Method of Analysis

The tabular method was used for the analysis and
same statistics such as analysis of variance and t-test of
significance were worked out for interpretation of results.

CHAPTER IV
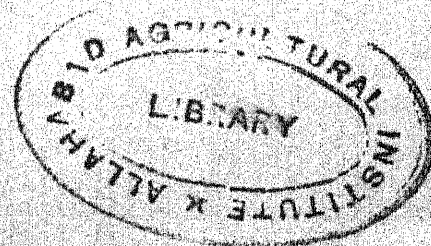
RESULT AND DISCUSSIONS

The absolute value of input and output as well as the relationship between them and among the various constituents of input factor is determined by structure of holdings. Therefore, in this Chapter, the structure of survey sample holdings has been discussed to provide the necessary background for proper understanding of farm economy and economics of individual enterprises. The discussions on structure of holdings here refers to their size groups, the cultivated area commanded by each size group, land utilization, intensity of cropping etc.

Average size of holdings:

In order to examine the details about farm productivity or productivity as related to some particular enterprise determining the average size of holdings becomes useful. The average size of holdings for respective group is given in the table 4.1

Table 4.1 Average Size of Holding

Size Group	Number of holdings	Area under each size group in hectares	: Percentage	Average size of holding
I (1-2.99 hectares)	23	58.20	22.06	2.53
II (3-5.99 hectares)	18	82.10	31.12	4.56
III 6 hectares & above	11	121.50	46.82	12.16
Total	52	261.80	100.00	5.27

It is clear from the table 4.1 that the average size of holdings were 2.53 and 4.56 in group I and group II farmers respectively and their ranges were equal. The third group's average size of holdings was 12.14 which was higher than first and second groups.

Structure of Sample Families:

Decision-making in the management of farm is closely related to the structure of farm families. The size of family plays an important role in the economy of farming and gives an idea about the pressure of population on land. The age and sex wise composition of the family gives an idea regarding the number of working age members in light of the income earning capacity. The composition of an average family according to sex and age is given in the table 4.2 below.

Table 4.2 Composition of an Average Sample Family

Size Group	Average size of family	Percentage of		Percentage of Age groups		
		Male	:Female	0-14yrs. years	15 -59 years	60 & above yrs.
I	4.26	58.75	41.25	26.12	52.63	21.25
II	6.30	56.16	43.84	24.33	62.62	13.05
III	5.20	17.13	42.87	40.50	45.20	14.30
Sample Average	5.17	57.51	42.49	28.54	54.51	16.95

It is revealed from table 4.2 that the average size of family in the sample comprises of 5.17 members working age-group (15-59) members were more in Group II (62.62) than the other groups. The percentage of below 15 age group was more (40.50%) in group - I than the other two. The percentage of males to the total members was found to be more (58.75%) in the group I and that of females in the second group (43.48) percent.

Literacy:

Literacy of the farmer is often a factor that affects the quality of farm business. It carries more importance in respect of the adoption of new technology. For this obvious reasons, the literacy aspect of the sample families was studied. The details of educational status of sample are given in table 4.3

Table 4.3   Education Status of Sample Families

| Group | Average size of family | Percentage of Literacy | | | | Percentage of literates | Percentage of illiterates |
		Primary School	Middle School	High School	Graduate		
I	4.26	32.50	6.25	2.50	2.50	43.75	56.25
II	6.30	26.50	9.06	8.24	5.36	49.06	50.94
III	5.20	24.20	12.16	10.32	7.64	54.32	45.68
Sample average	5.17	28.67	8.47	6.11	4.57	47.82	52.18

It can be seen from the above table that the literacy percentage was declining from group - III to group - I (54.32, 49.06, 43.75 percentage respectively) upto secondary education, there was not much difference in literacy percentage among three groups, this is because they all get free education . High School and above education was not considerably good in group I because lack of finance. On an average, 47.82 percent of sample members were educated and the rest were uneducated.

Land Utilization:

To meet the requirements of increasing population, we require efficiency in farm business and this can be reckoned through the study of land utilisation. Utilization of land gives an idea about the extent of land under cultivation and intensity of cropping, in addition to this, it gives about uncultivated area.

The cropping intensity may be considered as an indicator of the efficient use of land. Table 4.4 shows the land utilisation and cropping intensity.

Table 4.4 Land utilization and Cropping Intensity

Size Group	Average size of Holding	Area in hectares Net area sown (ha)	Double Cropped area(ha)	Gross sown area (ha)	Cropping Intensity %
I	2.53	2.47	0.42	2.87	116.10
II	4.56	3.73	1.31	5.04	135.10
III	12.14	11.90	2.72	14.62	122.85
Sample average	5.27	4.83	1.21	5.85	124.04

The table 4.4 clearly indicates that the cropping intensity was highest in group II (135.10%) when it's operated area was 4.56 hectares followed by group I with cropping intensity 122.85 which was quite close to the sample average. Gross sown area was highest 14.62 in group III. Intensity of cropping mainly depends on the area under irrigation.

Cropping Pattern:

The cropping pattern followed by a farmers indicates his preference for various crops, within the limitations of his resources. The cropping pattern of the sample farmers was studied to have general idea about the crops cultivated other than cotton, and is presented in the following table 4.5

It is observed from the table 4.5 that the cotton occupies a major place among the other crops. Next important crops in the sample area were chillies and paddy. Cotton occupies 31.8, 30.2 and 38.6 percent of gross sown area in first, second and third group respectively.

Table 4.5 Cropping Pattern

S. No.	Crops	Group I	Group II	Group III	Sample Average
1.	Cotton	0.92	1.62	5.63	2.16
2.	Chillies	0.83	0.90	2.30	1.17
3.	Paddy	0.21	1.10	2.76	1.06
4.	Groundnut	0.06	0.12	0.34	0.14
5.	Jowar	0.16	0.28	0.76	0.33
6.	Red Gram	0.07	0.06	0.22	0.10
7.	Other Pulses	0.21	0.23	0.61	0.30
8.	Tobacco	0.03	0.07	0.19	0.78
9.	Coriander	0.04	0.06	0.17	0.07
10.	Gram	0.02	0.03	0.12	0.04
11.	Turmeric	0.12	0.21	0.67	0.26
12.	Castor	0.02	0.07	0.23	0.08
13.	Vegetables	0.02	0.08	0.27	0.09
14.	Miscellaneous	0.16	0.21	0.34	0.22
	Gross Area Sown	2.87	5.04	14.62	6.80

Irrigation:

Irrigation in the new agricultural strategy has a
very important role to play adequate facilities of irrigation
reduce the risk involved in farming and ensures better crop
production. Most of the exotic varieties released during last
few years have specific water requirements with regard to
timing and quantity. The average area under irrigation and
its percentage to net area sown is given in table 4.6.

Table 4.6 Area under Irrigation

Group	Irrigated area (ha)	Percentage to net area sown (ha)	Un-irrigated area(ha)	Percentage to net area sown (ha)	Net area sown (ha)
I	1.16	45.84	1.37	54.16	2.53
II	2.21	48.46	2.35	51.54	4.56
III	5.96	49.09	6.18	50.92	12.14
Sample Average	2.54	47.43	2.73	52.57	5.27

The total area under irrigation was found to be more in the third group than the medium and small groups. On an average, 48.2 percent area was under irrigation.

Sources of Irrigation:

Because irrigation charges and also cost incurred in providing it varies by its source and because the source determines the extent of assured water availability this aspect assumes importance. The source of irrigation and distribution of area according to source is given in table 4.7.

Table 4.7 Sources of Irrigation

Group	Canal	Tanks	Total
I	1.16	-	1.16
II	2.13	0.08	2.21
III	5.17	0.89	5.96
Sample Average	2.44	0.13	2.54

Canal and tanks are the two major sources of irrigation in sample villages. Table 4.7 shows that area under canal irrigation was more than area under tanks irrigation in all the three groups of farm holdings. This was due to the fact that canal irrigation was cheaper source of irrigation than tanks.

Family members working on the Farm :

Labour is the most important factor of the farm production. Human labour is met mostly from the family under Indian conditions. The family members, more over, save the out of pocket expenses on wages and thus, reduce the burden of giving money as wages. Therefore, this aspect was studied separately. The following table 4.8 gives the details of family members working on the farm.

Table 4.8 Family Members working on the Farm

Size Group	Average size of family	Members working on the farm	Percentage to size of family
I	4.26	3.12	73.23
II	6.30	4.16	66.03
III	5.20	1.15	22.11
Sample Average	5.28	3.17	59.92

Table 4.8 says that the average members working on the farm were more in group - II (4.16) farmers than group - I (3.12) and group -III (1.15) farmers. But

percentage to size of family of the same was highest
in group- I (73-23) followed by group - II (66.03) and
group III (22.11). This is because the average size of
family was more in group -II than group - I farmers.

Adoption of High Yielding Varieties of Cotton:

The high yielding varieties have brought about
a revolution in crop production. A large number of trails
have proved to the farmers that adoption of high yielding
varieties is really profitable than local varieties. But
the adoption of high yielding varieties depends upon many
other factors like fertilizer irrigation and plant protec-
tion measures. The table 4.9 shows the distribution of
area under local and high yielding varieties of cotton
grown by the sample farmers.

Table 4.9 Distribution of area under high
Yielding and local varieties of cotton

Group	Area Under High Yielding Varieties	Area Under Local Varieties	Total
I	0.66	0.26	0.92
II	1.17	0.45	1.62
III	4.40	1.23	5.63
Sample Average	1.63	0.52	1.75

The area under high yielding varieties was only
76 percent of the total area under cotton. Average area under
high yielding varieties was found to be more in the third group.

Cost of Cultivation of Cotton:

The cost of cultivation includes the investment one the variable inputs used in the cultivation and the services rendered by the fixed assets. The cost of inputs used by the cultivators in the cultivation of cotton were calculated to study the contribution of each input in the total cost. A break-up of factor-wise distribution of cost per hectare is given in table 4.10.

The average total input cost per cropped hectare of High Yielding Varieties cotton comes to Rs 4885.44 while the same for traditional varieties worked out to Rs 2036.30 The difference in the per hectare cost of cultivation of High Yielding Variety cotton and traditional varieties of cotton approximated to Rs 2849.14. In both the cases the rental value of land increases the per hectare cost to a very great extent.

In case of High Yielding Varieties cotton for the example as a whole, the major items of expenditure were seen manures and fertilisers, insecticides, human labour and animal labour which worked out to be about 22.30, 18.94, 11.43 and 6.17 percentage of the total cost respectively.

In case of tradition cotton the main items of expenditure on input factors in order of merit where human labour, insecticides, manures and fertilisers and animal labour accounting for 18.21, 17.63, 15.63 and 8.54 respectively to the cost of cultivation. It was observed that no amount was being spent on irrigation for the cultivation of traditional varieties.
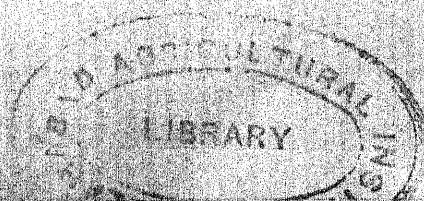
Table No. 10. Factor-wise distribution of Cost
per hectare of HYV

Inputs	Group I	Group II	Group III	Sample Average
Family Labour	261.36 (5.62)	272.26 (5.27)	190.30 (3.85)	250.10 (5.13)
Hired Labour	267.31 (5.75)	297.31 (5.76)	405.00 (8.19)	306.82 (6.30)
Bullock Labour	286.67 (6.17)	320.10 (6.20)	290.16 (5.87)	298.98 (6.17)
Seed	200.00 (4.30)	200.00 (3.87)	200.00 (4.04)	200.00 (4.09)
Manures and Fertilisers	960.00 (20.66)	1260.00 (24.48)	1139.10 (23.04	1101.76 (22.30)
Plant Protection	900.15 (19.37)	970.00 (18.81	900.11 (18.20)	924.34 (18.94)
Irrigation	130.16 (2.80)	156.00 (3.02)	132.10 (2.67)	139.51 (2.86)
Land Revenue	55.62 (1.19)	55.62 (1.07)	55.62 (1.12)	55.62 (1.16)
Depreciation	63.12 (1.35)	64.16 (1.24)	66.16 (1.33)	64.12 (1.34)
Rent for Implements	95.15 (2.04)	102.10 (1.98)	97.16 (1.96)	97.98 (2.14)
Interest on Working Capital	96.74 (2.08)	110.91 (2.15)	104.34 (2.11)	103.25 (2.14)
Interest on Fixed Capital	99.18 (2.13)	108.10 (2.09)	112.32 (2.27)	105.05 (2.18)
Rental value of own land	1230.60 (26.48)	1240.00 (24.04)	1250.00 (25.29)	1237.96 (25.36)
Total	4646.06 (100.00)	5156.56 (100.00)	4942.37 (100.00)	4885.44 (100.00)

Table No. 11.   Factor-wise distribution of Cost
per Hectare (Local Varieties)

puts	Group I	Group II	Group III	Sample Average
Family Labour	184.12 (9.50)	198.13 (9.23)	125.00 (6.01)	176.46 (8.66)
Hired Labour	142.18 (7.34)	212.12 (9.88)	275.60 (13.39)	194.61 (9.55)
Bullock Labour	170.72 (8.81)	180.72 (8.42)	170.13 (8.28)	174.06 (8.54)
Seed	38.15 (1.97)	39.00 (1.82)	39.00 (1.90)	38.62 (1.89)
Manures & Fertilizers	300.12 (15.48)	340.72 (15.87)	320.00 (15.55)	318.38 (15.63)
Plant Protection	350.13 (18.07)	370.77 (17.27)	350.80 (17.06)	358.10 (17.63)
Irrigation	-	-	-	-
Land Revenue	35.00 (1.80)	38.00 (1.77)	30.00 (1.86)	36.67 (1.80)
Depreciation	58.90 (3.04)	62.10 (2.89)	58.18 (2.83)	59.86 (2.94)
Rent for Implements	45.12 (2.32)	49.35 (2.30)	47.13 (2.29)	47.01 (2.30)
Interest on Working Capital	42.72 (2.20)	47.02 (2.19)	44.56 (2.18)	44.62 (94.73)
Interest on Fixed Capital)	51.00 (2.63)	58.65 (2.73)	56.12 (2.73)	54.73 (2.69)
tal Value of own Land	520.00 (26.84)	550.00 (25.63)	533.23 (25.92)	533.18 (26.18)
Total	1938.16 (100.00)	2146.63 (100.00)	2057.75 (100.00)	2035.30 (100.00)

Concentration breakup of Input Cost:

The total cost of cultivation has been split up according to cost concepts. There was no leased in land with any of the grower. Therefore cost A_1 and A_2 are the same. Table 4.12 illustrates cost per hectare based on cost concepts.

Table 4.12 Cost per hectare according cost concepts

Group	High Yielding Varieties			Local Varieties	Rupees	
	Cost A_1	Cost B	Cost C	Cost A_1	Cost B	Cost C
I	3054.92	4384.70	4646.06	1103.04	1754.04	1938.16
II	3536.20	4884.30	5156.56	1339.85	1948.50	2146.63
III	3389.75	4752.07	4942.37	1343.40	1932.75	2057.75
Sample Average	3292.34	4635.45	4885.45	1271.24	1859.16	2035.62

It was observed that cost A_1 per hectare was much higher for High Yielding Varieties other than the traditional varieties. The per hectare cost according to each of the cost concepts for High Yielding Varieties and local varieties were more in case of group two farmers.

Returns from Cotton:

The yield and gross income per hectare of High Yielding Varieties and local varieties was given in the following table No. 4. 12.

Table 4. 13 Yield and Gross Income per Hectare

Group	High Yielding Varieties		Local Varieties	
	Yield (Qt.)	Gross Income (Rs)	Yield (Qt.)	Gross Income (Rs)
I	21.72	9879.00	15.50	4650.00
II	24.16	10987.00	17.30	5190.00
III	22.18	10091.00	16.60	4980.00
Sample Average	2216	10307.26	16.35	4906.73

The yield of High Yielding Varieties and local varieties was found more in second group followed by third and first group. Total output in monetary terms which includes the value of by-product was found out for all farms. The gross income also shows the same trend on different groups as it was in the case of physical output. On an average, cotton High Yielding Varieties offer an addition gross income to the extent of Rs 5400.53 per hectare over local varieties.

By-product of Cotton:

Cotton stalks a by-product of cotton can be used for preparation of compost and manufacture of paper pulp. But the large proportion of cotton stalks were found to be used as fuel in villages. Cultivators found it uneconomical to transport it, and as a result they burn the excess stalks in the field itself. The contribution of main and by product in the gross income was given in table 4.14.

Table 4.14 Contribution of Main and By-product
to the gross income

Rupees

Group	High Yielding Varieties		Local Varieties	
	Main Product : By-Product		Main Product : By-Product	
I	9774.00	105.00	4572.50	77.50
	(98.93)	(1.07)	(98.33)	(1.67)
II	10872.00	115.00	5103.50	86.50
	(98.95)	(1.05)	(98.33)	(1.67)
III	9981.00	110.00	4897.00	83.00
	(98.90	(1.10)	(98.33)	(1.67)
Sample Average	10605.66	109.51	4824.55	83.78
	(98.93)	(1.07)	(98.33)	(1.67)

The contribution of by-product to the main product
was found to be very less in High Yielding Varieties. The
reason is that the high Yielding Varieties required more spacing.
than local varieties.

Measures of Farm Profits:

To judge the profitability of farming the income
measures that is net income, family labour income, farm
business income and farm investment income have been found suitable
by farm manager under Indian conditions. The following table 4.15
shows farm profits per hectare.

Table 4.15   Farm Profits Per Hectare

Group HYVs	Net Income	Family Labour Income	Farm Business Income	Rupees Farm Investment Income
I	5232.94	5494.36	6824.08	6562.72
II	5830.44	6102.70	7450.80	7778.54
III	5148.63	5338.93	6701.25	6510.95
Sample Average	5421.93	5672.05	7015.03	6764.94
Local				
I	2711.84	2895.96	3467.00	3282.84
II	3043.37	3241.50	3850.15	3652.02
III	2922.25	3047.25	3636.60	3511.60
Sample Average	2851.87	3047.57	3635.34	3459.02

It was seen from the table that the High Yielding Varieties gave higher net income, family labour income, farm business income and farm investment income per hectare than the local varieties.

The High Yielding Varieties gave ₨ 2570.06 as additional net income per hectare over local varieties. Net income on the second group farm was observed to be higher followed by first and third group for the High Yielding Varieties and local varieties.
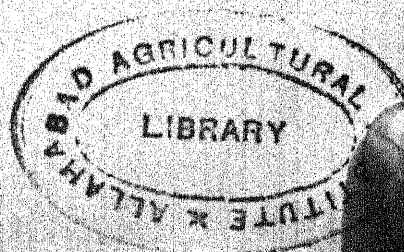
Input - Output Ratio:

Input - output ratio were calculated to compare the returns per rupee investment from each variety. The ratios for High Yielding Varieties and local varieties on three groups of holding are given in the table 4.16 below.

Table 4.16 Input - Output Ratios

Group	High Yielding Varieties	Local Varieties
I	1 : 1.89	1 : 2.40
II	1 : 2.13	1 : 2.42
III	1 : 2.03	1 : 2.42
Sample Average	1 : 2.00	1 : 2.41

The input - output ratios for High Yielding Varieties and traditional varieties respectively worked out to be 1 : 2 or 1 : 2.41. The input and output ratio was more in second group, followed by third and first group.

Cost of Production Per Quintal:

It has already been discussed in table 4.13 that the by-product of cotton fetches negligible price. It contribution to gross income was also found negligible. Hence, the cost for the by-product was ignored while working out the cost of production per quintal.

It was generally accepted to include the cost
of transportation and marketing while working out the
cost of production. The cost of production per quintal
on the basis of cost concepts and after including trans-
portation and marketing charges is shown in table 4.17.

Table 4.17 Cost of Production of Cotton Per
Quintal according to Cost Concepts

					(Rupees)
Group	High Yielding Varieties			Transportation & Marketing	Total
	Cost A_1	Cost B	Cost C		
I	140.65	201.87	213.91	4.25	218.16
II	146.37	202.16	213.43	4.35	217.78
III	152.83	214.25	222.83	4.30	227.13
Sample Average	145.21	204.59	207.94	4.30	219.93
Local Varieties					
I	76.33	113.16	125.04	4.20	129.24
II	77.45	112.63	124.08	4.20	128.33
III	80.93	116.43	123.96	4.22	128.18
Sample Average	77.69	113.67	124.48	4.22	128.72

It was observed from the table that cost A_1 per
quintal was much higher for High Yielding Varieties than
traditional varieties. The overall per quintal cost for
High Yielding Varieties approximates to R 219.93 the
corresponding figure for local variety worked out to be
about R 128.72.

Cost of Cultivation of Three High Yielding Varieties of Cotton

Table 4.16 Percentage distribution of cost per hectare for High Yielding varieties of cotton.

Inputs	Group I			Group II			Group III		
1. Family Labour	259.00	264.32	260.54	263.19	282.60	271.00	176.16	205.60	199.30
2. Hired Labour	258.18	274.15	269.00	287.19	309.18	255.12	315.10	470.30	450.15
3. Bullock Labour	271.10	306.73	281.15	282.10	360.30	318.10	260.12	301.12	390.10
4. Seed	30.00	370.00	200.00	30.60	370.00	200.00	30.00	370.00	200.00
5. Manures & Fertilisers	850.00	1060.00	970.00	1170.00	1350.00	1250.00	1060.00	1250.30	1150.30
6. Plant Protection	840.60	950.15	910.00	990.00	1020.00	960.00	980.00	930.00	920.00
7. Irrigation	95.32	170.16	125.13	105.00	210.00	158.00	95.12	170.00	130.00
8. Land Revenue	55.62	55.62	55.62	55.62	55.62	55.62	55.62	55.62	55.62
9. Depreciation	62.16	64.14	63.17	64.14	65.17	64.13	63.14	64.16	64.12
10. Rent for Implements	93.16	97.15	94.14	97.30	103.00	103.00	97.60	101.20	101.20
11. Interest on Working Capital	97.16	104.34	95.17	99.16	120.92	111.00	102.16	104.30	104.11
12. Interest on fixed Capital	94.16	104.14	98.96	106.12	107.00	107.12	115.14	114.12	114.12
13. Rental Value of own land	1250.14	1260.10	1250.60	1250.00	1350.00	1250.00	1360.00	1250.00	1250.00
Total	4916.87	5082.80	4683.43	4770.48	5521.50	5295.59	5360.75	4702.83	4780.38

From the above table 4.18 the cost of cultivation in three varieties it was found in the second group to be higher followed by third and first group. It can be seen that it is the rental value of owned land which increases the total cost to a great extent. Manures and fertilizers, a major item of expenditure , cost of seed is also a major item of expenditure for the producers of Varalaxmi and H_4.

Returns from Cotton:

The Physical output of cotton - the yield of seed cotton - has been studied on the sample farms. The yield per hectare of High Yielding Varieties is given in the following table 4.19.

Table 4.19 Yield of Cotton Per Hectare

Group	MCU - 5	Varalaxmi	H_4
I	21.65	22.65	27.73
II	23.75	24.83	31.43
III	21.41	22.95	27.69

From the above table 4.19 that H_4 variety yields more followed by Varalaxmi and MCU - 5. All these varieties yielded more on second group farms and least on the first group.

Total output in monetary terms which includes the value of by-product. The selling price per quintal for long

staple variety is more than short staple variety. Gross income per hectare is given below.

Table 4.20 Gross Income Per Hectare

Group	MCU - 5	Varalaxmi	H₄
I	8436.00	11402.80	9791.43
II	9600.48	12541.90	10874.10
III	8664.48	11640.73	9785.80

The above table explains that Varalaxmi Variety gives more monetary returns than other varieties. The gross income also shows the same trend on different groups as it was in the case of physical output.

Net Income per Hectare:

The net income per hectare is given below in Table 4.21.

Table 4.21 Net Income Per Hectare

Group	MCU-5	Varalaxmi	H₄
I	4220.00	6340.00	5138.00
II	4830.00	6920.00	5741.00
III	4160.00	6280.00	5005.00

It is seen from the table 4.21 that Varalaxmi variety gives higher net income than other two varieties. Net income on the second group farm was observed to be higher followed by first and thrid group.
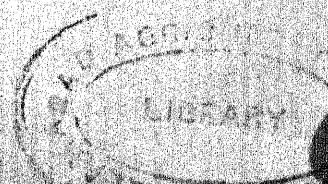
Statistical Analysis to get significant
difference between High Yielding Varieties and Local Varieties.

There is significant difference in net income
from High Yielding Varieties over local varieties.

The statistical analysis to get the significant
difference between high yielding varieties and local
varieties the method of analysis of variance has been used
in the calculation for this test.

The following table gives the net income between
the high yielding varieties and local varieties for different
size groups. The following table 4.22 showing the net
income between High Yielding Varieties and local varieties
for different size groups.

Table 4.22   Net Income between High Yielding
Varieties and Local Varieties

Group	HYV	Local	Total
I	5233	2712	7945
II	5830	3043	8873
III	5149	2922	8071
Total	16212	8677	24889

Since the figures are very big they have been
divided by constant thousand to reduce them to a manageable
figure and furthermore the figures are rounded to the
whole.

Variety/Group	HYV	Local	Total
I	5.0	3.0	8.0
II	6.0	3.0	9.0
III	5.0	3.0	8.0
Total	16.0	9.0	25.0

Table 4.23 For Analysis of Variance

Sources of Variation	D.F.	S.S.	M.S.	Variance	F 1%	5%	10%
Varieties	1	8.17	8.17	47.65	98.49	99.30	
Groups	2	0.34	0.17	1.06			
Error	2	0.33	0.16				
Total	5	8.84					

Hence F test indicate that there are significant difference between the local and the high yielding varieties, means, since observed value of the variance ratio is significant at 5% level.

Thus the hypothesis proved i.e. the high yielding varieties gives better net income over local varieties.

Statistical analysis to find out the significant difference within the varieties in the High Yielding varieties cultivated in the area of the study.

Null hypothesis shows there is significant difference in net income within the varieties MCU-5, Varalaxmi and H_4.

The following table gives the net income within the High Yielding Varieties under different size groups.

Table 4.24 Net Income within the H.Y.V.

Variety/ Groups	MCU-5	Varalaxmi	H_4	Total
I	4220.00	6340.00	5138.00	15698.00
II	4830.00	6920.00	5741.00	17494.00
III	4160.00	6280.00	5005.00	15445.00
Total	13210.00	19540.00	15884.00	48634.00

Since the figures are very big they have been reduced by dividing them with a constant figure of one thousand and further rounded upto whole number.

Variety/ Groups	MCU-5	Varalaxmi	H_4	Total
I	4.00	6.00	5.00	15.00
II	5.00	7.00	6.00	18.00
III	4.00	6.00	5.00	15.00
Total	13.00	19.00	16.00	48.00

Table 4.25 Analysis of Variance

Source of Variation	D.F.	S.S	MSS	Variance	F 1%	F 5%
Variety	2	-88	-44	1.76	21.20	7.4
Group	2	-23	-12.2	0.47		
Error	4	-103	-25.7			
Total	8	8				

Here F test indicates that there are no significant differences within the varieties and also within the groups. Since the observed value of the variance is non-significant at 5% level.

In order to find out the High Yielding Varieties significant , a critical difference based on analysis of variance has been calculated. The varieties have been by setting them in decending order of their net incomes in the following manner.

	2	3	1
I	6	5	4
II	7	6	5
III	6	5	4

Calculation of critical difference.

Standard error of the difference between the three varieties means $\frac{2VE}{r}$

Standard error   = 5.6

Critical difference   = 15.512

$$= \frac{2 \; X - 25.7}{2}$$

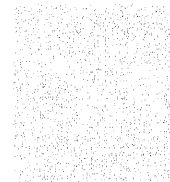$$= \frac{-51.4}{2}$$

$$= 25.7$$

$$= 5.06$$

$$C.D. = 5.6 \times t \; .05 \quad 2.77$$

$$= 15,512$$

From the analysis of critical difference it was found there was no significant difference within the varieties.

Thus the null hypothesis is approved.

————————

CHAPTER V

SUMMARY AND CONCLUSION

Indian economy is a developing economy and therefore rate of growth plays an important role to bring the country to achieve economic independence. The national income constitute approximately 50 percent from the agricultural sector. Unfortunately per unit output in the agricultural sector is very low as compared with other countries. In order to achieve self-sufficiency in the food crops as well as other items of agricultural origin per hectare yield has substantially increased because extensive cultivation is not possible and naturally improved method of cultivation is necessiated.

The present study is confined to a comparative study of the local and high yielding varieties of cotton crop in Tyalluru block in Guntur District, Andhra Pradesh. Cotton is a commercial crop and much of the cash income of the farmers come out of its cultivation. In the interest of national economy and farmers own interest it is obligatory to obtain higher productivity per unit of input. It is on account of this fact that there is a competition between food and non-food crops for the scarce resources. The present study is based on the hypothesis that the high yielding varieties of cotton give high net income than local varieties. It is further aimed in this study to

find out the most suitable variety out of the recommended high yielding varieties to farmers that they get maximum returns out of their investment.

Achievement in the level of cotton output to a great extent depends on the profitability of the High Yielding Varieties. A comparative study of the economic aspects in the cultivation of High Yielding Varieties and traditional varieties was, therefore, felt timely and useful in the context of the felt need mentioned above as also in the context of available new strains involving new technology.

Tyalluru Block of Guntur District of Andhra Pradesh was purposively selected because cotton is cultivated by large number of farmers in this area. The data were collected from 52 farmers cultivating both high yielding varieties and traditional cotton varieties through the field investigations conducted during the year 1974-75. The survey was conducted by "personal interview" method with the help of a pretested questionnaire in keeping with the objectives of the study.

Cropping intensity for an average farm was found to be 124.04 percent. Cotton occupies about 31.5 , 30.2 and 30.6 percent of gross sown area in first, second and third groups respectively. Of the total area under cotton high yielding varieties accounted for 76 percent. Sample farmers had about 47 percent of net sown area under irrigation.

But there was insignificant difference in the groups.
Canal was the major source of irrigation.

The per hectare cost of cultivation of High Yielding
Varieties and traditional cotton varieties worked out to
about Rs 4885.44 and Rs 2036.30 respectively. Thus, High
Yielding Varieties cotton growers had to incur about Rs 2749.14
more than the traditional cotton variety growers. The cost
of cultivation between the size group for MCU-5 was Rs 4216.62,
Rs 4770.48 and Rs 4504.48 for first, second and third size
groups respectively. For Varalaxmi it was Rs 5062.80 , for
the first size group and and Rs 5621.90 for second size
group and Rs 5360.73 for third size group. For variety H_4
the cost per hectare for group I, II and III were Rs 4338.86
Rs 4732.66 and Rs 4598.60 respectively.

Examining the cost on various items, it was found
for both the variety classes that the rental value of
land increased the per hectare and also per quintal cost
to a very great extent. In case of High Yielding Varieties
cotton varieties, for the sample as a whole, the major items
of expenditure were manures and fertilizers, insecticides,
human labour and animal labour respectively covering about
22.30, 18..0,   ercent of cost C.

_ cotton the main items of
expenditure on input factors in order of merit were human
labour, insecticides, fertilizers and manures respectively

accounting for 18.21 percent, 17.63, 15.63 and 8.54 percent to the total cost of cultivation.

The yield of main product per hectare for High Yielding Varieties was 20.16 quintals and 16.35 quintals for local varieties. The value of total gross income per hectare for local and high yielding varieties were Rs 10307.26 and Rs 4906.73 respectively. As regards the measures of farm profits for High Yielding Varieties it was found that the net income, family labour income and farm business income were Rs 5421.93, Rs 5672.05, Rs 7015.03 and Rs 6764.94 respectively. Like-wise for local varieties those were Rs 2851.87, Rs 3047.57, Rs 3635.05 and Rs 3459.02 respectively. Net income per hectare from MCU-5 Vara-laxmi and H₄ was Rs 4403.00, 6513.00 and 5295.00 respectively.

The input and output ratio was 1 :2.00 and 1:2.41 over High Yielding Varieties and local Varieties respectively.

The cost of production per quintal was Rs 219.93 for High Yielding Varieties and for local varieties it was Rs 128.72.

The Analysis of Variance worked out to find the significant difference between the high yielding and local varieties and it was found that there was significant difference between local and High Yielding varieties at 5 percent level. Therefore High Yielding Varieties are recommended for adoption for the area under study.

Further analysis of variance was done to find the significant difference within the High Yielding Varieties and it was found that there is no significant difference at 5 percent level. This was also testified by working out critical difference for these varieties.

CONCLUSION:

The study throws light on the fact that the farmer should adopt High Yielding Varieties for higher net income rather than local varieties and this will meet the best utilisation of existing resources. Within the High Yielding Varieties it was found that there was no significant difference in the net income obtained by their cultivation. It means the farmers can grow any of the three varieties to get the higher income from cultivation of crops.

SUGGESTIONS:

1.   The State Department of Agriculture should keep a close watch on the farmers cultivating High Yielding Varieties of cotton and give timely technical advices.

2.   The small farmers should be encouraged to take High Yielding Varieties and should be financed by credit institute like Co-operatives or Banks.

3.   Shortage of fertilizers calls for an action to give training to farmers for timely and efficient use of available quantity of fertilizers with intensive use of available labour.

4.   By-product of cotton which goes as waste should be utilized in preparing compost.

5.   High rates of returns of cotton will remain meaningless unless the produce finds its way into the market Therefore, it is suggested that farmers should be given facilities for marketing the price of cotton should be stabilized through Government support price in order to encourage cotton cultivation.

LITERATURE CITED

Books:

1. Chandel, S.R.S., A Handbook of Agricultural Statistics;
   Achal Prakashan Mandir, Kanpur, 1970.

Reports:

2. Draft Fifth Five Year Plan Vol. 1, 1973. New Delhi.
   Planning Commission, Govt. of India.

3. Mirchandena, G.G. 1971. Aspects of Agriculture in India
   UNI Record). Bombay : Allied Publishers.

Journals:

4. Choken Singh, "More from Irrigated Cotton" Intensive
   Agriculture, Vol. XII, No. 10, Dec. 1974, pp. 14.

5. Dixit R.S., Mishra, S.D. "An Economic Analysis of Cotton
   Cultivation". Agri. Situation in India, Vol. XXIII,
   No. 10, Jan. 1969. pp. 1031-6.

6. Gangwar, A.C. and Singh I.J. "Economic feasibility of
   financing Cotton Growers in Hissar District
   Haryana." "Finance Agriculture"Vol. VII, No. 1,
   April-June 1975, pp. 14-16.

7. Garg, J.S. and Singh, G.N. "Economics of Production and
   Marketing of Cotton in Bulandshahr District -
   A Case study. "Agricultural Marketing, Vol. XIII,
   No. 3, Oct. 1970, pp. 1-5.

8. R. Kaul, J.U., Sondhi, R.K, "Differential Growth of
   Productivity in the Punjab". World Agricultural
   Economics and Rural Sociology Abstracts, Vol. 16,
   No. 1, Jan. 1974, pp.35.

9.   Ruts, S.B. "Crop Insurance under GSFC 4-P Plan"
          Agriculture and Agro-Industries Journal, Vol. VI,
          No. 11, Nov. 1973. pp. 5-8

10. Madalia, V.K., Makadia, M.U. "A study on Economics of
          Cotton cultivation in Baroda District".
          Finance Agriculture, Vol. VII, No. 111, Oct. Dec.
          1975, pp 15-18.

11. Maharaja, M.M. Economics of cotton cultivation. "A Study
          in a selected region of Saburkantha District in
          Gujrat." World Agricultural Economics & Rural
          Sociology abstracts. Vol. VIII, No. 4, Dec. 1966
          pp.706.

12. Mudhokkar, Ahalawat, I.P.S.J. A Population Explosion in
          Cotton for higher Production". Farmer and
          Parliament. Vol. VIII, No. 8, Aug. 1973 pp. 15-16.

13. Muthuswami Gopalan, "Importance of white gold in the
          nation's economy.". Khadi Gramodyog . Vol. XV,
          No. 9, pages 441-444.

14. G. Parthasarathy, Indian Journal of Agricultural
          Economics. Vol. XXVII, No. 2, April-June, 1972,
          pp. 103.

15. Pattanshetti, C.C. and Gopal Rao, M.S., "Regulated
          markets and Agricultural Prices", The Journal of
          Karnataka University - Social Sciences, Vol. II,
          May 1966. p. 12.

16. Raingeard, J.K. "Expansion of the world cotton market"
          World Agricultural Economics and Rural Sociology
          Abstracts Vol. No. 16, & 11, Nov. 1974 pp 16-17.

17. Reddy, A.S. and Venkateswarlu, V., "The Economics of
          Cotton (MCU-5) Cultivation in Guntur District,
          Andhra Pradesh, " 'Agriculture and Agro-Industries
          Journal. Vol. VI, No. 11, Nov. 1973, pp. 1-4.

18. C. Rajagopal Reddy "Economics of Varalaxmi Cotton Cultivation in Guntur District, Andhra Pradesh," Financing Agriculture, Vo; VI, No. 4, Jan. 1975, pp. 16-17.

19. O.B. Rao, M.V. Pavate, S.V. Verma, "Shift of area towards better staple Cotton", Agriculture and Agro-industries Journal Vol. 7, No. 7, July 1974, pp. 13-16.

20. Singh, M., Singh, K. and Brar, H. 1974. How Cotton Yield can be Raised, Progressive Farming, Mar.10.

21. Shukla Nanra - 'Intensive Agriculture', Vol. No. 7, September 1972, pp. 119.

22. Shukla, B.D. and Singh, R.S. "Economics of Cotton Cultivation in Mathura District", World Agricul-tural Economics and Rural Sociology abstracts Vol. XI, No. 4, Dec. 1969 pp. 700.

23. "Cost of Cultivation in Maharashtra State", Statistical News Letter, I.A.R.I., New Delhi, Vol. XII, No. 1, April 1965, pp. 12-15.

24. ...."Stepping Up Cotton Production - Three-Year Programme Launched", Farmer and Parliament, Vol. VI (9), September 1971, pp. 19-21.

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A P P E N D I X

Method of Evaluation

A. Evaluation of Farm Assets:

Self cultivated lands have been evaluated at the rates prevailing in the village at the time of enquiry taking into account the type of soil, distance from village, irrigation etc.

(1) Farm lands and Houses etc.

Evaluated at the market price at the time of enquiry.

(2) Implements and Machinery

Evaluated at the market price.

B. Evaluation of Farm Output

Crops both main and by-products, fodder etc. have been evaluated at the market price at the time of enquiry.

C. Evaluation of Farm Inputs

(1) Casual hired labour:

Actual amount paid in cash/value of kind payment evaluated at harvest prices.

(2) Family Labour:

The cost of labour days has been evaluated at the village average rate for annual servant. Permanent labour is treated as family labour.

(3) Labour Utilization:

A labour day in case of male was taken as 8 hours

and 6 hours in the case of female.

(4) Bullock Labour

Owned and hired bullocks were charged at a
flat rate prevailing in the village for hiring
in bullocks.

(5) Supervision:

These charges have not been included.

(6) Seed, Manures and Fertilizers:

The actual amount paid in the purchase of these
items was considered. The value of home produced
farm yard manure was taken on the basis of prevail-
ing market rate.

(7) Irrigation Charges:

In the case of canal irrigation, the amount paid
for the area under cotton was considered. The actual
irrigation cost has been calculated in the following
manner.

Irrigated area under each crop was multiplied
by the number of irrigations given to that crop
and summed up. The total cost of irrigation was
divided by the summation to arrive the cost of
one irrigation per acre.

(8) Land Revenue:

Actual amount paid for the area under cotton.

(8) Rent Paid for Implements:

Actual amount paid for hiring the implement
was considered.

(9) Depreciation:

Depreciation on the assets was calculated by "straight line method". The total depreciation was distributed according to area under each crop.

(10) Interest on Working Capital:

Calculated at 3 percent of the working capital for crops.

(11) Interest on Fixed Capital:

After depreciating the fixed capital, the value at 1st June 1975 was calculated and interest calculated at 6 percent rate. The capital engaged in the irrigation has already been considered while calculating irrigation charges. Hence, it was ignored here.

(12) Rent:

There was no leased in land with sample cultivators. The rental value of owned land was estimated at the rate of 6 percent of present value of land based on the long term loan.

(13) Marketing Charges:

Include transportation, octroi, market cess, weighing charges etc.

B. COST CONCEPTS

The collected data were analysed by applying the following cost concepts.

Cost Al : It is actual paid out cost for owner cultivator. This cost approximates the expenditure incurred in cash and /or kind and include the following items, (1) Hired human labour (2) Owned and hired bullock labour (3) Seeds (4) Manures and Fertilizers (5) Expenses on plant protection (6) Depreciation (7) Rent paid for implements (8) Land revenue (9) Irrigation charges; and (10) Interest on working capital.

Cost A2: Cost Al rent paid for leased in land.

Cost B: Cost A2 + rental value of owned land + interest on owned fixed capital.

Cost C : Cost B + imputed value of family labour.

(C) MEASURES OF FARM INCOME :

    (1) Farm business income: Computed by deducting Cost Al from gross income

    (2) Family labour income: Obtained by deducting Cost B from gross income.

    (3) Net income: The excess of gross income over cost C.

    (4) Farm investment income: The excess of gross income over Cost C, excluding from it the rental value of owned land and interest on fixed capital.

PROFORMA OF FAMILY SCHEDULE

Name of the cultivator _____

Village_____ Block _____ District _____

Family Members _____ Male_____ Female_____ Children _____

Below 15 _____ 15 to 59 years _____ 60 years & above _____

Total _____ Primary _____ Secondary _____ High School

Literates _____ Education_____ Education_____ Education__

No of members:
working on the
Farm _____ Male _____ Female _____ Children_____

2. LAND UTILISATION:

S.No.	Items	Total area
1.	Total Holding	
2.	Operated Holding	
3.	Permanent Fallow	
4.	Net area sown	
5.	Gross Area sown	
6.	Land under Irrigation	

3. DETAILS OF LAND UNDER COTTON:

Plot No.	Area	Present value	Variety of Cotton	
			Irrigated	Unirrigated

4. CROPPING PATTERN:

Plot S. No.	Area		Name of the crop		
	Irrigated	Unirrigated	Kharif	Rabi	Zaid

5. CROPPING INTENSITY
6. IRRIGATION SOURCES

Crop	Area Mat.	No. of Irrigations

7. INVENTORY OF IMPLEMENTS AND MACHINERY:

S. No.	Nature of the Implements	No.	Date of Purchase	Price	Deprecia-tion	Value on 31st May to June, 1975.

A) Implements.

1. Iron plough
2. Wooden Plough
3. Harrow
4. Hoes
5. Bullock cart
6. Miscellaneous implements.

B) Machinery

1. Sprayers
2. Dusters
3. Electric Pump with accesso- ries.
4. Oil Engine with accessories.
5. Other machinery

C) Others

1. Rope
2. Kudali
3. Pawada
4. Axe
5. Sickel & others

8. LIVE STOCK INVENTORY:

S.No.	Items	Age	Year of Purchase	Price	Value	
					At the beginning of the year	At the end of the year

A. BULLOCKS:

1.
2.

B. COWS

1.
2.

C. BUFFLOWS:

   1.

   2.

D. Others

9. INVENTORY OF BUILDING :

Sr. No.	Items	Life Period	Cost	Repairs & charges	Depreciation	Present value
1.	Residential					
2.	Store					
3.	Farm building					
4.	Cattle shed					
5.	Other building					
6.						

10. COST OF CULTIVATION OF HYV COTTON:

Area   Irrigated   Date of sowing
             Unirrigated.   Method of sowing:

S.No. Name of operations	Frequency.	Family Labour			Hired Labour wage r				
		M	F	B	M	F	B	M	F

1. PREPARATION TILLAGE:
  i. Ploughing
  ii. Harrowing
 iii. Stubble picking
  iv. Clod crushing & Levelling
  v. Marking of field.

2. APPLICATION OF MANURES (Carting & Sprading)

3. Other operations
4. Sowing

5. INTERCULTURE OPERATIONS:
  i. Hoeings
  ii. Weeding
 iii. Gap filling & thinning
  iv. Leaf plucking
  v. Other operations

6. APPLICATION OF FERTILIZERS:
  i. Hand application
  ii. Spraying & Dusting Insecticides & Fungicides.

7. Irrigation
8. Watching

9. HARVESTING:
    i. Picking of cotton
   ii. Carting
  iii. Cleaning

10. Marking:

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11. LABOUR AND MATERIAL
    REQUIREMENTS

Sr. No.	Items	Units /Quantities	Total cost/ value
1.	a) Hired Labour Male/Female b) Family labour Male/Female		
2.	Bullock labour		
3.	Manures (Cart load)		
4.	Fertilizers		
5.	A) Nitrogenous		
	i)		
	ii)		
	B) Phosphates Fertilizer		
	i)		
	C) Potash Fertilizers		
	i)		
	D) Mixed Fertilizers		
	i)		
	ii)		
5.	Seed:		
6.	Insecticides/Pesticides		
	i)		
	ii)		
7.	Irrigation charges		
8.	Marketing cost (Ootrai, Dalal etc.		
9.	Land Revenue		
10.	Others		

12. PLOTWISE YIELD OF THE CROP:

Plot No.	Area in Hect-ares	Yield per HETR.		Total Yield		Value per quintal		Total value	
		Kapas	Stalk	Kapas	Stalk	Kapas	Sta-lk	Kapas	Sta-lk

1. FARM BUSINESS INCOME   Rs

2. FAMILY LABOUR INCOME   Rs